An automatic device for rolling culture tubes of nutrient agar agar.

GEO. F. ATKINSON.

(WITH PLATE XI.)

Rolled culture tubes of nutrient agar agar are so convenient for the separation of many micro-organisms, and are employed by so many investigators for the study of the growth and conformation of colonies that any device for rolling them successfully is worthy of note. Especially is this the case when such device is, under certain circumstances at least, an improvement over the present methods in use.

The device introduced by Esmarch of spinning the tubes on the surface of ice water while a rubber cap covered the cotton plug was improved upon by Dr. Booker, of Johns Hopkins University by spinning them in a groove upon a block of ice.[1] This is an exceedingly satisfactory method. There is one difficulty encountered, however, which in many cases varies from a trifling to a very serious matter, according as ice is obtained with comparative ease or great difficulty. Those who are fortunate enough to be located in centers where trade demands for ice provide a constant supply, encounter simply a trifling expense and the little attention necessary to obtain the supply needed. Many institutions and workers, however, are so situated that it is almost impossible during the winter months to obtain ice without going to great expense, and many times during any season of the year the trouble alone of providing it is no small annoyance.

Being so situated myself I have given my attention to devising some means of rolling the tubes with precision by making use of the water supply commonly provided for in laboratory fittings. It is possible with a stream of cold water from a faucet to so hold with the hands and revolve a tube as to distribute and fix the nutrient agar in a thin and tolerably even film. But many failures result and at best the tube is far inferior to one rolled on ice.

Recently I have made an automatic device for rolling the tubes under a continuous shower of cold water as perfectly and regularly as it is possible to do on ice and with far less trouble even though a constant supply of ice is within easy reach.

[1] Mead Bolton: Schizomycetes, etc. Reference Handbook of Medical Sciences, vol. VI.

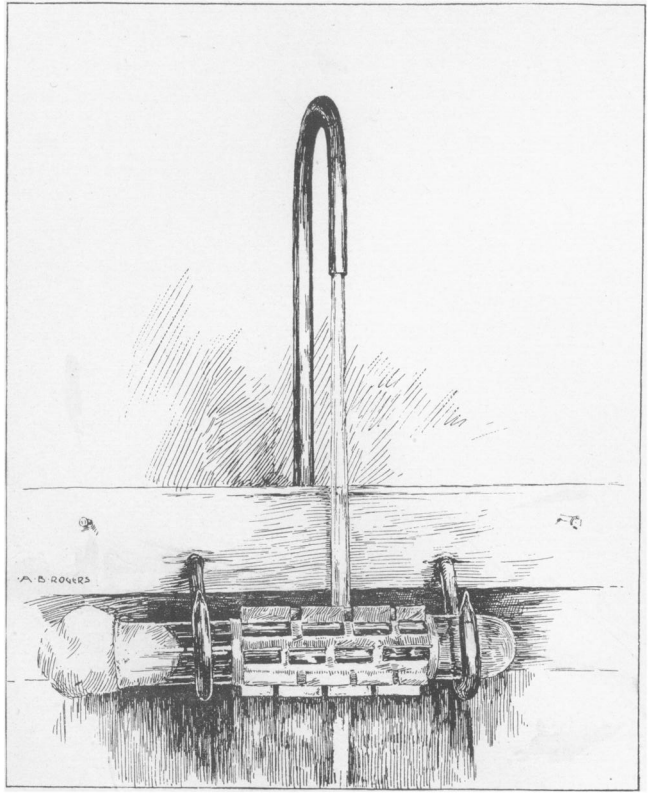

FIGURE 2.—Culture tube at rest.

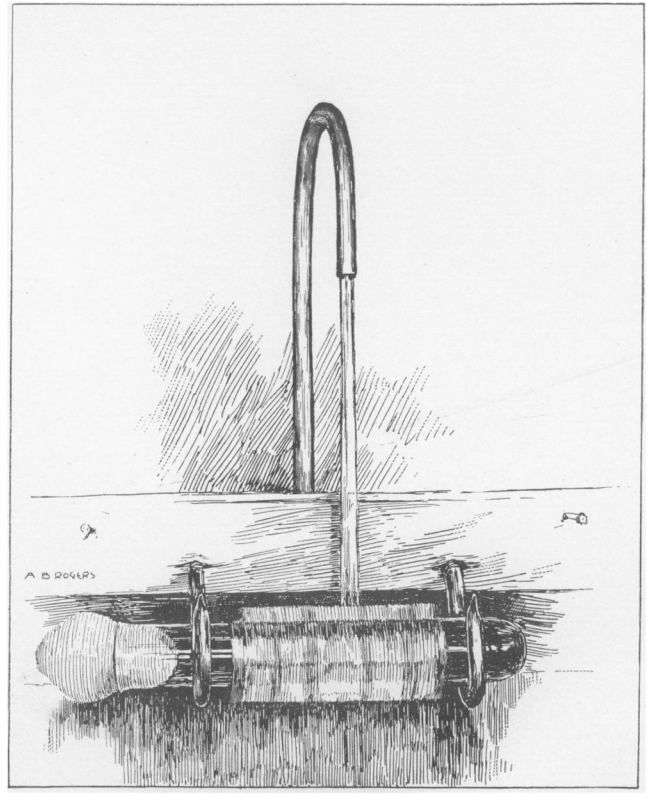

FIGURE 3.—Culture tube in motion.

ATKINSON on a DEVICE FOR ROLLING CULTURE TUBES.

It consists of a tin jacket, with rectangular perforations and bristling with "paddles," which grasps the tube and upon which the stream of water is so directed that it furnishes not only the motive power for whirling the tube but also the cold bath to solidify the agar agar. This device, quiet and in motion, is shown in figures 2 and 3 in plate XI.

The jacket I made in about an hour's time. It is quickly and easily slipped from one tube to another. The frame work which rests across the edges of the sink and holds the supports for the tube was the work of a few moments. The

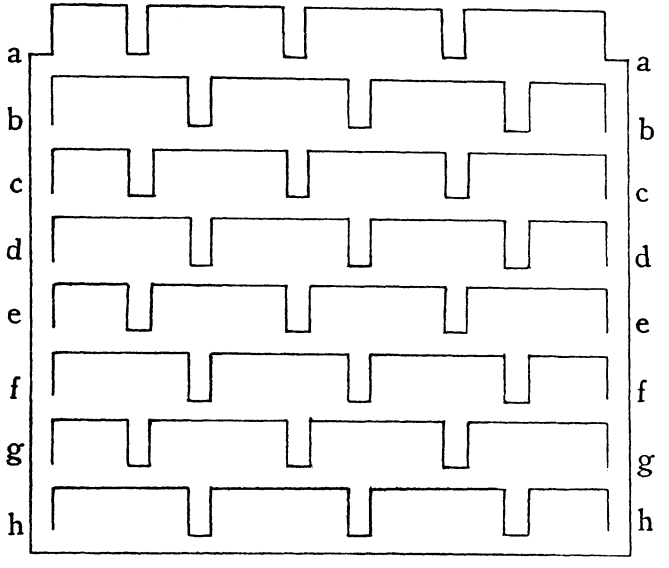

FIGURE 1.—Outline of jacket for rolling culture tubes. Full size.

jacket was made from a single piece of tin as follows: The tin was first cut the exact size of figure 1, three edges being straight while one edge was cut as shown in the figure. Now placing the sheet of tin upon a block of wood, with a quite narrow sharp chisel cuts were made corresponding to the irregular lines *b b*, *c c*, etc. The sheet was then placed in a vise down to *a a*, and the four rectangular projections bent perpendicularly to the sheet in the same direction that the chisel was driven. The sheet is then raised to the line *b b*, and so on until all the small rectangular pieces are bent out to

serve as paddles; the spaces serve to admit the water upon the tube.

The sheet is now bent around a cylinder of a somewhat less diameter than the test tubes to be used. This gives the jacket a tension which enables it to grasp the tube firmly. By erecting the paddles in a direction corresponding to the cut of the chisel, the inner surface of the jacket is left smooth and does not scratch the glass in slipping it on or off.

For the support of the tube while under the shower bath I used two ceiling hooks which I screwed into a narrow board long enough to rest across the sink. They should be so levelled that the end of the tube containing the cotton plug will be very slightly elevated. The rapid motion will prevent the agar from gravitating down the tube while water will not run on to the plug.

In rolling the tubes the frame is drawn a trifle forward so that the stream of water passes in front of the frame, but just behind where the tube will rest. So soon as the tube is lifted from the warm water bath the jacket is slipped on, the tube then held horizontally, while the liquid agar is first distributed evenly in the usual way. Place it immediately on the supports as shown in figure 2, plate XI, then quickly slide the frame backward so that the water strikes the paddles when the tube immediately revolves as shown in figure 3, plate XI. The supports must not pinch the tube in the least else the friction will interfere with the freedom of the revolutions. The jacket and frame when not in use should be kept dry to prevent rust.

A little practice will determine the proper distance for the jacket from the end of the tube. It is best to have it a little nearer the bottom end of the tube and to allow the stream of water also to strike somewhat nearer the corresponding end of the jacket. This lessens the danger of wetting the cotton plug. As I have arranged mine, when running very rapidly the plug is kept dry.

In making the jacket due regard should be had for the size of the tube to be rolled. Within certain limits tubes of different diameters can be rolled with the same jacket since its elasticity permits some variation in its accommodation to the tube.

Alabama Polytechnic Institute, Auburn.